

New Genera and Species of Brachycistidine Wasps from Southwestern North America (Hymenoptera: Tiphidae: Brachycistidinae)

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Abstract.—The new genera *Brachymaya*, *Paraquemaya* and *Sedomaya* are described from southwestern Arizona, Baja California and Sonora Mexico, and Imperial Co., California. *Brachymaya* is based on the new species *mexicana*. *Paraquemaya* is based on the new species *pallida*, and *Sedomaya* is based on the new species *glanisensis*. Three other new species of *Paraquemaya* are also described: *bitincta*, *maxima*, and *bajaensis*.

Until recently (Kimsey and Wasbauer 1998) the subfamily Brachycistidinae had not received taxonomic attention in nearly three decades. The last major revisions of any kind of members of this group were published by Mickel and Krombein (1942) and later by Wasbauer (1958, 1966 and 1968). Studies of unidentified male brachycistidines, which have accumulated in collections in the past 30 years, have revealed a variety of new taxa.

Six of these undescribed species had a combination of features, which did not fit any of the current generic groupings. Preliminary cladistic analyses of the Brachycistidinae indicated the need to describe three new genera for these species. Each of these genera is characterized by a unique combination of apomorphic features, which occur in other brachycistidine genera in various combinations. They include a tailed antennal socket, external mandibular carina, stridulatory structure on the forecoxa, an elongate digitus, changes in the position of the carina enclosing the oral fossa, loss of the hindcoxal carina, loss of the basolateral carinae on the first gastral tergum, and highly reduced wing venation. The first of these genera, *Paraquemaya*, has a large number

of primitive features, although it is still more highly derived than *Quemaya*. *Paraquemaya* has the following apomorphic characteristics: a tailed antennal socket, presence of a mandibular carina, an elongate digitus and hindwing venation similar to that seen in *Brachycistellus* and *Hadrocistis*. The second new genus, *Brachymaya*, appears to be most closely related to *Brachycistina* and *Hadrocistis*, based on the slender, ecarinate mandible and lack of the dorsal carina on the hindcoxa. Finally, the third genus, *Sedomaya*, belongs to a group of genera with the stridulatory structure on the forecoxa and the first gastral sternum with a short medial carina. This group also includes *Brachycistis*, *Brachycistellus* and *Colocistis*.

As with many of the brachycistidine genera the undoubtedly wingless, and probably nocturnal, females are unknown. Although a number of genera have been described based only on females (Mickel and Krombein 1942) the taxonomy of the Brachycistidinae is essentially based on the males. None of the female-based genera described by Mickel and Krombein (1942) are known to occur in the same region as the taxa described below (Fig. 1), although this is no guarantee that there is

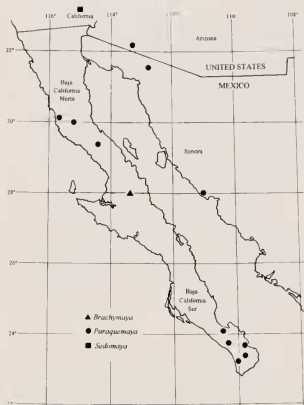


Fig. 1. Distribution map showing collection localities of the brachycistidine genera *Brachymaya*, *Paraquemaya* and *Sedumaya*.

no geographic overlap. In addition, the genera described by Mickel and Krombein are relatively large, ranging in length from 5–12 mm. The females of the new genera described below should be small, about 2–3 mm in length, roughly the size of female *Quemaya*, which are also as yet undescribed. Female brachycistidines described thus far are considerably larger than the females of *Brachymaya*, *Paraquemaya* and *Sedumaya* should be based on the male to female body size ratio seen in species where both sexes have been described. Additionally, no hosts are known for any of the new species described below. Description of these new genera is essential to enable us to finalize phylogenetic analyses of the subfamily Brachycistidinae.

MATERIALS

Specimens used in this study came from the Bohart Museum of Entomology, University of California, Davis, S. L. Heydon

(DAVIS); California Academy of Sciences, San Francisco, N. Penny (SAN FRANCISCO); Los Angeles County Museum, California, R. R. Snelling (LOS ANGELES); University of California, Riverside, S. Frommer, S. Triapitsyn (RIVERSIDE), and the personal collection of M. S. Wasbauer. Type repositories are indicated by the capitalized name given in parentheses.

Brachymaya Kimsey and Wasbauer, new genus (Figs. 2, 6, 18, 19)

Description of male.—Face (Fig. 6): Mandible with two apical teeth and without longitudinal carina on external surface; palpi long, extending well outside of oral fossa, maxillary palpus 6-segmented; labial palpus 4-segmented; inner eye margin converging medially; flagellomeres somewhat arcuate, particularly apical articles; antennal carina greatly thickened into ventral subtriangular process, with tail-like carinule; gular carina with large subtruncate swelling near mandible; clypeus medially evenly convex, apical margin without ventral bevel; forecoxa without stridulatory patch; scrobal pit small and circular; propodeum without longitudinal groove on dorsal surface and without transverse carina; metasternum without medial ridge terminating in two lobes near hindcoxa base; hindcoxa without ventral or dorsal longitudinal carinae; wings (Fig. 2): forewing with one large rhomboid submarginal cell, and smaller second submarginal cell, marginal cell nearly parallel-sided, R1 barely visible and bending away from the costal margin toward the stigma, one discoidal cell, one subdiscoidal cell; hindwing M vein diverging from Cu + M after cross vein cu-a; gastral segment I, tergum with well-developed lateral carina at base, sternum without longitudinal carina extending from base; epipygium delimited by small sublateral welt, apex truncate or somewhat short and apically rounded; genital capsule (Figs. 18, 19): paramere slender

and tapering dorsally; volsella with small submedial lobe externally, inner surface with several rows of denticles; digitus elongate terminating in acutely pointed lobe.

Distribution.—This genus is known only from the vicinity of San Augustine, BCN, Mexico.

Etymology.—The name is intended as a nonsense combination of letters, taken from *Brachycistis* and *Quemaya*, and is assumed to be feminine.

Type species.—*Brachymaya mexicana* n. sp.

Discussion.—*Brachymaya* is somewhat similar to *Brachycistina* and *Hadrocistis*. All three genera are characterized by having a slender mandible, with subsidiary dentition reduced to one or two very small teeth, and the hindcoxa lacking a dorso-basal carina. As with most brachycistidine genera *Brachymaya* has the digitus elongate and pointed. However, *Brachymaya* has the antennal socket subtended by a large triangular enlargement of the carina and the gular carina is dilated, forming a truncate projection near the mandibular base. In addition, the wing venation is reduced, with one discoidal and one submarginal cell.

***Brachymaya mexicana* Kimsey and Wasbauer, new species**

(Figs. 2, 6, 8, 19)

Description of male.—Body length 5–6 mm; face (Fig. 6); clypeus evenly convex medially, apical truncation 0.9–1.0 midocellus diameters wide; interantennal distance 0.7–0.8 midocellus diameters wide; distance between midocellus and nearest eye margin 1.4–1.5 midocellus diameters; flagellomeres I–II 2.2–2.4 times as long as broad; facial and thoracic punctures small, shallow and widely spaced, 4–6 puncture diameters apart; forewing with two submarginal cells (Fig. 2); abdominal segments appearing impunctate, integument finely shagreened; genital capsule (Figs. 18, 19). Head dark brown; thorax and legs

pale yellowish brown; abdomen darker brown; forewing venation yellow, except stigma brown; hindwing venation yellow; wing membrane faintly yellow tinted.

Type material.—Holotype male: Mexico: BCN, San Augustine, 20 Oct. 1956, R. Mattoni (LOS ANGELES). Paratypes: three—same data as holotype (LOS ANGELES, DAVIS); one—3 mi. s. San Augustine, 14 June 1973, J. Doyen (DAVIS).

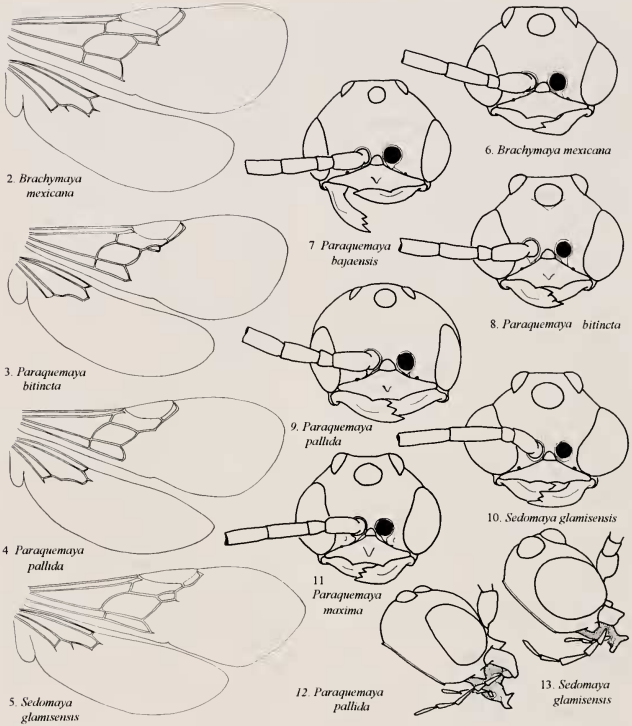
Etymology.—This species is named after the country of collection.

Discussion.—Although there are currently no other species placed in this genus, species distinctions probably include proportions of the flagellomeres, ocellular distances, punctuation and coloration of the wing veins.

***Paraquemaya* Kimsey and Wasbauer, new genus**

(Figs. 3, 4, 7–9, 11, 12, 14–17)

Description of male.—Face (Figs. 7–9); Mandible with three apical teeth and longitudinal carina on external surface; palpi long, extending well outside of oral fossa, maxillary palpus 6-segmented; labial palpus 4-segmented; flagellomeres somewhat arcuate; antennal carina slightly thickened ventrally, but without tail-like carinule; gular carina with tooth-like projection near mandible (Fig. 12); forecoxa without stridulatory structure; scrobal pit small and circular; propodeum with longitudinal groove on dorsal surface and no transverse carina; metasternum with medial ridge terminating in two small lobes near hindcoxal base; hindcoxa without ventral or dorsal longitudinal carinae; wings (Figs. 3, 4); forewing with one large rhomboid submarginal cell, and smaller second submarginal cell in several species, marginal cell nearly parallel-sided, R1 barely visible and bending away from the costal margin toward the stigma, one discoidal cell, one subdiscoidal cell; hindwing M vein diverging from Cu + M after cross vein cu-a; gastral segment I, tergum with well-developed lateral carina at base, vis-



Figs. 2-13. Figs. 2-5. Fore and hindwing of males. Figs. 6-11. Front view of male face, with right antenna removed. Figs. 12, 13. Side view of male head.

ible in most specimens, sternum with short longitudinal carina extending from base; epipygium delimited by small sublateral welt, apex truncate or somewhat rounded; genital capsule (Figs. 14-17): parameres slender and tapering apically; volsella with small rounded submedial

lobe, inner margin with small denticles; digitus elongate and awl-shaped.

Distribution.—This genus occurs in southern Arizona and Baja California, Mexico.

Etymology.—The generic name refers to the superficial similarity, because of their

small size, to species of *Quemaya*; feminine.

Discussion.—Although *Paraquemaya* resembles *Quemaya* in terms of its reduced wing venation and small size, it shares the majority of characteristics with more derived brachycistidine genera including *Brachycistis* and *Brachycistellus*. Features shared with these genera include the elongate digitus, carinate mandible, unmodified palpi, basal gastral sternum with a

medial carina, and basal tergum with a well-developed lateral carina adjacent to the petiolar insertion. The presence of a gular tooth is a characteristic shared with some species of *Brachycistis* and one *Quemaya* species. Additional diagnostic features include the lack of hindcoxal carinae, no forecoxal stridulatory structure and the configuration of the hindwing venation, which is very similar to that of *Hadrocistis* and *Brachycistellus*.

KEY TO THE SPECIES OF *PARAQUEMAYA* (MALES)

1. Forewing with two submarginal cells (Fig. 3); interantennal distance 0.5 midocellus diameter wide or less; body usually appearing bicolored with thorax paler than head and abdomen 2
- Forewing with one submarginal cell (Fig. 4); interantennal distance more than 0.5 midocellus diameter; body concolorous 3
2. Shortest distance between midocellus and eye margin 1–1.2 midocellus diameters wide (Fig. 11); flagellomeres I and II subequal, 2.3–2.6× as long as broad ... *maxima* new species
- Shortest distance between midocellus and eye margin 1.4–1.6 midocellus diameters wide (Fig. 8); flagellomere I shorter than II, 2.2–2.3 times as long as broad and II 2.3–2.5× as long as broad *bitincta* new species
3. Flagellomere I 2.0–2.2 times as long as broad (Fig. 9); flagellomere II 2.2–2.4× as long as broad; interantennal distance 0.6–0.8 midocellus diameters wide; shortest distance between midocellus and eye margin 1.8–2.0 midocellus diameters wide *pallida* new species
- Flagellomere I 1.7–1.9× as long as broad (Fig. 7), flagellomere II length 2.0–2.2× breadth; interantennal distance 0.8–0.9 midocellus diameters wide; shortest distance between midocellus and eye margin 2.1–2.3 midocellus diameters wide *bajaensis* new species

Paraquemaya bajaensis Kimsey and Wasbauer, new species (Fig. 7)

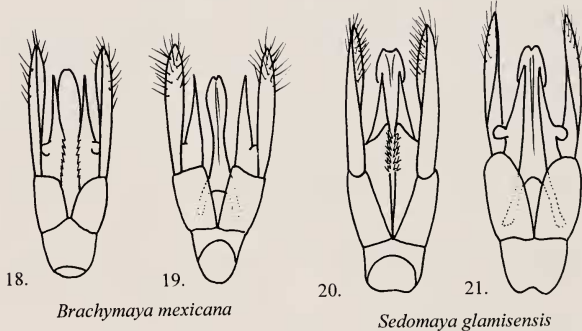
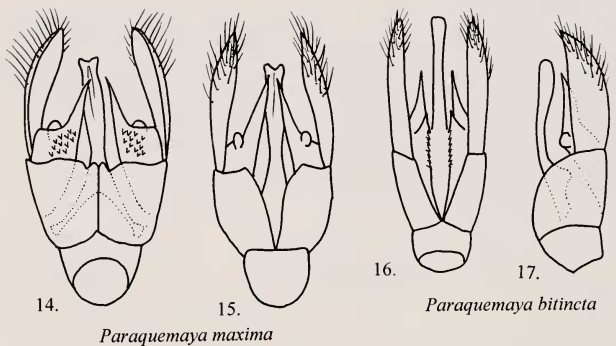
Description of male.—Body length 4 mm; face (Fig. 7); clypeus with narrowly acute medial projection, apical truncation 0.9 midocellus diameter wide; interantennal distance 0.8 midocellus diameter; distance between midocellus and nearest eye margin 2.3 midocellus diameters; flagellomere I twice as long as broad; flagellomere II length 2.4× breadth; facial and thoracic punctures small and widely spaced, 4–6 puncture diameters apart; forewing with one submarginal cell; abdominal segments appearing impunctate, integument finely shagreened. Body color dark brown; fore-

wing venation light brown-tinted, except stigma darker brown; hindwing venation faintly brown-tinted; wing membrane untinted.

Type material.—Holotype male; Mexico, BCS, 14 mi s El Arco, 2 Nov. 1965, W. Ewart & R. Dickson (RIVERSIDE). Paratypes: 1 male same data as holotype, except 5 Nov. 1965; one male: BCN, El Consuelo, 0–50 ft. elev., 11 Sept. 1983, R. R. Snelling (DAVIS).

Etymology.—The name is derived from the region of collection, Baja California, Mexico.

Discussion.—This species most closely resembles *pallida*, as both have a single submarginal cell and the body color is



Figs. 14-21. Male genital capsule. Figs. 14, 16, 18, 20. Ventral view. Figs. 15, 19, 21. Dorsal view. Fig. 17. Lateral view.

concolorous. These two also have the widest ocellular distance and widest interantennal distance. *P. bajaensis* has the smallest ocelli in the genus, with the midocellus separated from the eye margin by 2.3 midocellular diameters. This species also has the longest basal flagellomeres of any species of *Paraquemaya*.

Paraquemaya bitincta Kimsey and
 Wasbauer, new species
 (Figs. 3, 8, 16, 17)

Description of male.—Body length 5 mm; face (Fig. 8); clypeus with narrowly acute medial projection, apical truncation 1 midocellus diameter wide; interantennal distance 0.3 midocellus diameter; distance

between midocellus and nearest eye margin 1.6 midocellus diameters; flagellomeres I and II subequal, length 2.3–2.4× breadth; facial and thoracic punctures small and widely spaced, 4–8 puncture diameters apart; forewing with two submarginal cells (Fig. 3); abdominal segments essentially impunctate, integument finely shagreened; genital capsule (Figs. 16, 17). Body color reddish brown, head and abdomen darker brown than thorax; forewing venation untinted, except stigma brown; hindwing venation untinted; wing membrane untinted.

Type material.—Holotype male: Arizona, Pima Co., Organ Pipe, 12 April 1947, A. L. Melander (RIVERSIDE). Three paratypes, same data as holotype (RIVERSIDE, DAVIS).

Etymology.—The name, *bitincta*, is derived from the two-tone brown color of the body.

Discussion.—This species can be distinguished from *pallida* and *bajaensis* by the presence of two submarginal cells. It can be separated from *maxima* by the smaller body size, shorter flagellomeres shorter, and greater distance between the eye and the midocellus.

***Paraquemaya maxima* Kimsey and
Wasbauer, new species**
(Figs. 11, 14, 15)

Description of male.—Body length 7 mm; face (Fig. 11); clypeus with acute, narrowly hooked medial projection, apical truncation 1 midocellus diameter wide; interantennal distance 0.5–0.6 midocellus diameters; distance between midocellus and nearest eye margin 0.1–1.1 midocellus diameters; flagellomeres I and II length 2.6× breadth; facial and thoracic punctures small and widely spaced, 4–6 puncture diameters apart; forewing with two submarginal cells; abdominal segment I with broad, shallow irregular punctures and shagreening; segments II–V with sparse shallow punctures, 4–6 puncture diameters apart; genital capsule (Figs. 14, 15).

Body color: head and abdomen brown, thorax lighter reddish brown; forewing venation pale brown-tinted, except stigma reddish brown; hindwing venation nearly colorless; wing membrane untinted.

Type material.—Holotype male: Mexico, Sonora, 22 km se Quitovac, 14 Nov. 1965, W. Edward & R. Dickson (RIVERSIDE). Two paratypes, same data as holotype (DAVIS, RIVERSIDE).

Etymology.—The name is based on the unusually large body size for this genus.

Discussion.—Other than the large body size of this species, the two submarginal cells and long flagellomeres will distinguish *maxima* from other species placed in *Paraquemaya*.

***Paraquemaya pallida* Kimsey and
Wasbauer, new species**
(Figs. 4, 9)

Description of male.—Body length 3.5–6.0 mm; face (Fig. 9); clypeus with small acute medial projection, apical truncation 1.0–1.3 midocellus diameters wide; interantennal distance 0.6–0.8 midocellus diameters; distance between midocellus and nearest eye margin 2.0–2.2 midocellus diameters; flagellomere I 2.0–2.2 times as long as broad; flagellomere II length 2.2–2.4× breadth; facial and thoracic punctures small and widely spaced, 3–5 puncture diameters apart; forewing with one submarginal cell (Fig. 4); abdominal segments with sparse shallow punctures, 2–4 puncture diameters apart. Body color pale reddish brown, rarely darker brown; forewing venation slightly brown-tinted, except stigma darker; hindwing venation untinted.

Type material.—Holotype male: MEXICO: Baja California Sur, 4 mi. wsw Miraflores, 23–24 April 1979, M. Wasbauer (DAVIS). Paratypes, 68 males (DAVIS, SAN FRANCISCO): 25—same data as holotype; four—El Salto, 8 mi ne Todos Santos, 9 Oct. 1983, D. Faulkner & F. Andrews; twenty-six—Los Barriles, 24 Mar.–5 April 1984, J. H. Lynch; two—Puerto Es-

condito, 10–14 July 1989, R. Shaver; one—BCN, Sierra Calamajué, 11 km e Chapala, 29°31'N 115°42'E, 23 Aug. 1994, S. Heydon; one—BCS: El Pescadero, Playa Los Cerritos, 16–17 April 1979, M. Wasbauer; one—BCS, 13 mi nw La Paz, 10 Nov. 1965, W. Ewart and R. Dicksen; one—Sonora, 14 mi w Guaymas, 13 Nov. 1965, Ewart and R. Dicksen.

Etymology.—The name, *pallida*, refers to the pale coloration of the male.

Discussion.—*Paraquemaya pallida* is characterized by having one submarginal cell, flagellomeres I and II subequal in length and about 2.2× as long as broad, and the midocellus separated from the eye by 2 midocellus diameters or slightly less.

***Sedomaya* Kimsey and Wasbauer,
new genus**

(Figs. 5, 10, 13, 20, 21)

Description of male.—Face (Fig. 10): mandible with three apical teeth and longitudinal carina on external surface; palpi long, extending well outside of oral fossa, maxillary palpus 6-segmented; labial palpus 4-segmented; eye strongly converging medially, inner eye margin slightly indented; flagellomeres somewhat arcuate, particularly apical articles; antennal carina slightly thickened ventrally, but without tail-like carinule; gular carina with large subtruncate swelling near mandible (Fig. 13); clypeus medially concave and slightly trilobate apically, apical margin with ventral bevel; forecoxa with small stridulatory patch; scrobal pit small and circular; propodeum with obsolescent longitudinal groove on dorsal surface and no transverse carina; metasternum with medial ridge terminating in two small lobes near hindcoxal base; hindcoxa with dorsal longitudinal carinae, without ventral one; wings (Fig. 5): forewing with one large rhomboid submarginal cell, and smaller second submarginal cell, marginal cell nearly parallel-sided, R1 barely visible and bending away from the costal margin toward the stigma, one discoidal cell, one

subdiscoidal cell; hindwing M vein diverging from M + Cu after cross vein cu-a; gastral segment I, tergum with well-developed lateral carina at base, visible in most specimens, sternum with short longitudinal carina extending from base; apical tergum evenly convex, apex truncate or somewhat rounded; short and apically rounded; genital capsule (Figs. 20, 21): paramere slender and tapering apically; volsella with rounded medial lobe, inner margin with numerous small denticles; digitus elongate and apically acute.

Distribution.—This genus is known only from the vicinity of Glamis, in the Algodones Dunes, Imperial Co., California.

Etymology.—The name is a nonsense combination of letters, and is assumed to be feminine.

Type species.—*Sedomaya glamisensis* n. sp.

Discussion.—No one genus appears to be the sister group of *Sedomaya*. It belongs to the group of genera characterized by the presence of a stridulatory structure on the forecoxae, elongate digitus and the first gastral sternum with a short longitudinal carina extending posteromedially from the base. *Sedomaya*, *Dolichetropis*, *Acanthetropis* and *Colocistis* all have a ventral clypeal bevel below the apex. However, unlike the latter three genera *Sedomaya* has highly reduced wing venation, having only two small forewing submarginal cells and one discoidal cell.

***Sedomaya glamisensis* Kimsey and
Wasbauer, new species**

(Figs. 5, 10, 13, 20, 21)

Description of male.—Body length 5–7 mm; face (Figs. 10, 13); clypeus medially convex, apex slightly trilobate with medial lobe projecting anteriorly in profile; apical truncation 0.9–1.0 midocellus diameters wide; interantennal distance 0.4–0.5 midocellus diameters; flagellomere I–II 2.9–3.1 times as long as broad; facial and thoracic punctures small, shallow and widely spaced, 4–6 puncture diameters apart; forewing with one submarginal cell (Fig.

5); abdominal segments appearing impunctate, integument finely shagreened; genital capsule (Figs. 20, 21). Body color pale reddish brown; fore and hindwing venation yellow; wing membrane slightly yellow tinted.

Type material.—Holotype male: California, Imperial Co., Glamis, 23 April 1972, M. Wasbauer, blacklight (DAVIS). Paratypes: twenty-five males (DAVIS); two—same data as holotype; twenty-two—3 mi n Glamis, 15–16 Sept. 1972, M. Wasbauer and A. Hardy; four—10 Sept 1974, M. Wasbauer and R. McMaster.

Etymology.—This species is named after the vicinity of the collection sites in and around Glamis, on the edge of the Algodones Dunes.

Discussion.—As with *Brachymaya mexicana*, species distinctions within this genus will probably be based on flagellar dimensions, the size of the midocellus and its distance to the ocular margin, other facial

dimensions and perhaps the configuration of the clypeus.

ACKNOWLEDGMENTS

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